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MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF VASSAR COLLEGE

XII. THE SOURCES OF THE AFFECTIVE REACTION TO FALLACIES

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About a hundred young women students, mostly college Juniors, were asked to introspect the impression produced upon them by a set of logical fallacies. In the original plan six of these faulty arguments were used, the design being to have two specimens of each of the three types of formal fallacy: illicit major, illicit minor, and undistributed middle; and to construct one of each pair with a true conclusion, the other with a false conclusion. In practice, the syllogism used to represent the fallacy of illicit minor with a true conclusion proved unsatisfactory, being so obviously wrong as not to produce the impression of an argument at all, and it was therefore discarded. The observers were asked in the first instance to record whether the arguments were agreeable or disagreeable, and then to report any further considerations that occurred to them. The great majority of them had had no training in formal logic. Nineteen had pursued a course in argumentation, and seven had studied logic in preparatory schools. Fifty-four, however, had had a course in introductory philosophy, in which the syllogism had been briefly explained.

The following were the faulty syllogisms used:

1. (Undistributed Middle: true conclusion.) "All trees are vegetables; all oaks are vegetables, therefore all oaks are trees."
2. (Same: false conclusion.) "Virtuous people always make profitable use of their time; day laborers make profitable use of their time, therefore day laborers are virtuous."
3. (Illicit Minor: false conclusion.) "Only criminals should be put under restraint; for all criminals are dangerous to society, and all persons who are dangerous to society should be restrained."
4. (Illicit Major: true conclusion.) "Church property is not taxed; for it is not private property, and all private property is taxed."
5. (Same: false conclusion.) "Mathematical study improves the reasoning powers; but as the study of logic is not mathematical study, we may infer that it does not improve the reasoning powers."

The papers that were handed in proved to contain material of much interest, but material with which it has been by no means easy to deal. As any one who has undertaken a similar task knows, analyzing and classifying a large mass of introspective results involves the danger of falsifying them. In the desire to bring order out of chaos, statements are brought together under the same heading that represent really different mental processes; and in general much of the value of the introspections is lost by the cutting and drying process to which they are subjected. A great amount of the most careful study has been devoted to the reports of our observers in the

present instance; they have been gone over again and again, and as a result we think we have gathered some information about the sources through which a mistake in reasoning produces an unpleasant effect upon the mind. These sources, as they appear from the introspections of our observers, we shall now discuss one by one.

(a) The *content* of the ideas contained in the syllogism. By this is meant that in a certain number of cases, the first affective reaction of the observer was to the agreeable or disagreeable character of one of the terms of the argument, or some directly suggested idea; and in other cases this was one of the sources of pleasantness or unpleasantness. For example, in (3), the idea of criminals, or of the insane, was unpleasant; in (2), the idea of day-laborers and in (5), the idea of mathematics were disagreeable. The number of observers reporting this as an important source of their affective reaction was for (2), eight; for (3), four; for (4), one, and for (5), five. Evidently such a source of pleasantness or unpleasantness as this is not in any way characteristic of the reasoning processes as such. The ideas of mathematics or of criminals would have been just as unpleasant if they had been suggested outside of any argumentative context, for instance, in a series of disconnected words. In the case of the first argument, a special instance of affective reaction determined by the content of the idea was the unpleasantness experienced by many of the observers on account of the incongruous images suggested by 'tree' and 'vegetable.' Eight persons gave this as the only reason for finding the syllogism unpleasant, and two of these said that as soon as 'vegetable' was understood in the scientific sense the argument became pleasant; thus evidently wholly overlooking the fallacy. Fifteen others found the incongruity one among various reasons for the unpleasantness of the syllogism. Incongruity, as a source of unpleasantness, is evidently 'relational' in character; it involves what is commonly known as thought rather more than do the other instances of the content of ideas as affective source, where nothing more than the mere reproduction of an image is necessary.

(b) The *truth* or *falsity* of the statements. In the case of the second argument twelve persons reported that they found it unpleasant merely because they denied the truth either of the conclusion, or of the conclusion and one of the premises. Eight persons gave the falsity of the conclusion in (3) as their only reason for disliking the syllogism, and three mentioned it as one among other reasons. Three observers reported the falsity of the conclusion, in (5), as the only source of unpleasantness, and five gave it as one source. What mental processes are involved in recognizing that a statement is false? Our data throw light on this problem in a few cases only. The conclusion of (2), that day-laborers are virtuous, aroused in those observers who analyzed their consciousness of its falsity a sense of the incongruity of the subject and predicate; several reported that they had a mental picture of a gang of workmen, dirty, quarrelsome, and disorderly. In other cases it is probable that the consciousness of incongruity was present without involving any images. The conclusion of (3), that only criminals should be put under restraint, instantly suggested to most of the observers who were disturbed by its falsity the idea of insane persons at large; in three cases the idea of a particular insane person. Here the hitch came between the word 'only' in the conclusion and the thought of the insane, and the feeling not merely of incongruity but of incompatibility or contradiction was aroused. Into the more ultimate nature of these 'feelings' our data do not allow us to go. In the case of (5), those observers who were disturbed by the falsity of the conclusion that logic does not improve

the reasoning powers seemed, as nearly as we could judge, merely to be conscious of the contradiction between this statement and statements to the contrary which they had previously met with; that is, no images were called up, and very likely only verbal formulas regarding the value of logic were suggested, if anything more than a bare 'feeling of dissent' was present. In so far as we get any information from our results, the consciousness of the falsity of a statement may involve (1) a vague feeling of dissent or negation, (2) a feeling of incongruity or incompatibility between the subject and predicate of the statement; (3) a feeling of incongruity or incompatibility between some idea contained in the statement and other ideas not contained in it but suggested by it. Whatever its nature, evidently the consciousness of the falsity of one of the statements in an argument is something aside from the process of reasoning involved in the argument itself; the statement would be unpleasant on account of its untruth even if it stood alone and unconnected with the other propositions of a syllogism, just as the content of an idea might be disagreeable although the idea was suggested in isolation.

(c) A sense that something *definite* has been *omitted*. In the first syllogism, each one of the three propositions is true. Six of the observers recorded that they experienced unpleasantness from this argument because they thought at once of many other vegetables besides those mentioned in the premises. Here for the first time we have a source of unpleasantness that is truly logical. Only a part of the 'middle term' is referred to in either premise, and the reasoning process, which ought to pass smoothly from minor to middle and from middle to major term, is broken and interrupted by the occurrence to the mind of other ideas, such as those of cabbages and carrots, which are as naturally suggested by the middle term 'vegetables' as is the major term 'trees.' With the occurrence of these other ideas comes a sense that they should have been taken account of in the argument, and a consequent unpleasant affective tone. Four observers found the chief source of unpleasantness in the fourth argument to lie in the thought of other kinds of property being taxable besides private property. Here the discomfort seems to arise from the fact that the thought process, which should pass smoothly along the course: 'church property—other than private property—not taxed,' is led off from the middle term 'other than private property' to the thought of cases of public property that are taxed. None of the observers, however, reported that they thought of specific instances of public property being taxed; the 'sense of something omitted' was not as definite as in the case of the first syllogism. In (3), the idea of insane people presented itself with more or less definiteness as needing to be taken account of to render the argument logical (not merely to make the conclusion true) in the minds of nineteen of the observers, if we may judge by the fact that this number of them said the word 'only' should be changed to 'all.'

(d) Closely connected with the source of unpleasantness just mentioned is one which may indeed be the same experience in a different stage of development: the sense of a definite *lack of equivalence* between the terms. For example, in the case of (1), five of the observers said the argument was unpleasant because "two sub-classes of the same class are not necessarily identical," or words to that effect. Seven others found it disagreeable because it involved an attempt to apply the mathematical axiom that things equal to the same thing are equal to each other, where such an application could not be made. In the case of (2), eight persons said that one quality common to two classes did not make them identical, and four put the same idea from

what the logician would call the point of view of extension, by saying that two parts of the same class are not necessarily identical. In these instances the observers' state of mind seemed to be not so much the consciousness of certain ideas that should have been but were not included in the argument, like the 'carrots and cabbages' in (1) or the insane people in (3), as a more vague and abstract mental process for which no more fitting descriptive term than 'consciousness of inequality' presents itself. Such a mental process must be of frequent occurrence in purely mathematical reasoning. It probably varies from a practically unanalyzable 'relational' process, through a more complex process associated with some vague ideas of the omitted factors, the other parts of the class which have not been taken into account, and thus by imperceptible gradations may pass into a process involving definite thought of the neglected ideas, such as we have discussed under (c). It is to be noted that the mere 'consciousness of inequality' would not of itself be a source of unpleasantness; the unpleasantness must arise from the fact that the terms *ought not* to be unequal. The thought of two sub-classes as not being identical with each other would not be disagreeable unless the argument demanded their equality. Is it not probable that the unpleasantness in this case arises ultimately from the same source as it did in (c); that is, from the confusion and division of attention that result when instead of passing smoothly from one term to the next, attention is 'led aside' to consider the omitted factors? In the instances we are considering, the omitted factors are not definitely thought of as they are in the cases under (c), but even although they are represented only by an unanalyzable relational process, the affective tone which would accompany the clear and developed thought of them may be transferred to the relational 'consciousness of inequality.'

(e) Under this head we may consider the cases where unpleasantness arose because of a quite vague and *indefinite sense of something wrong* with the argument. The observer cannot or at least does not state that anything is wrong with a particular part of the reasoning; she does not 'place' the wrongness; it is only vaguely felt. "Something is wrong with the 'therefore,'" said two observers in the case of syllogism (1). Two persons complained that (5) was 'unconvincing' and therefore unpleasant. Four gave 'incompleteness' without further specification as the source of unpleasantness in (1). It is, of course, impossible to be sure, with our untrained observers, that the sense of incompleteness was in every case perfectly vague; the omitted factors might have been thought of with some definiteness although the observer did not take the trouble to report the fact. But it seems probable that a sense of something lacking did sometimes accompany the reading of the arguments without being attached to anything definite. The term most frequently used to describe the vague sense of something wrong was 'confusion.' Five persons named this as the sole source of unpleasantness in the first syllogism; three in the second, four in the third, five in the fourth, and two in the fifth. 'Confusion' would seem to be one degree vaguer than a sense of 'something omitted.' One might enumerate the logical sources of the unpleasantness of a fallacy in the following order, beginning with the most indefinite, the passage from each stage to the next being brought about by better attention and analysis: general sense of confusion, sense of something omitted, sense of a lack of equivalence between two of the terms, clear idea of the omitted factors. All of these processes are unpleasant for what is ultimately the same reason: a tendency to division of the attention instead of allowing it to pass smoothly from one term to the next.

(f) It will not be inappropriate to consider under a special heading the reports of certain observers who were distinguished from the rest through taking what we may call a *subjective* attitude towards the arguments, or perhaps 'personal attitude' would describe it better. In most of these cases there was probably recognition of the fallacy, in some sort of terms, but the unpleasantness attached either to the thought of the observer herself as being the subject of an attempt to deceive, or to the imaginary propounder of the argument. In the case of (1), three persons described their attitude as one of 'irritation' at the maker of the argument; one said she felt 'scorn,' another confessed to a 'pugilistic impulse,' and still another declared the author of the syllogism to be "beyond the reach of argument." Three, on the other hand, felt wounded self-esteem, a 'sense of being deceived.' These experiences were mentioned in the case of the other arguments also. They show how close the connection may be between intellectual processes and the fighting instinct.

(g) Three observers gave their general dislike of formal arguments as the chief reason for finding the syllogisms unpleasant.

We must also take into account those observers who found the arguments either wholly or partly *pleasant*, and those who experienced no reaction at all. The percentage of observers finding the syllogisms wholly agreeable was for (1), seven; for (2) twelve; for (3), ten; for (4), twelve, and for (5), nine. The percentage of observers finding the arguments partly pleasant and partly unpleasant was, for (1), eleven; for (2), three; for (3) six; for (4), five, and for (5), four. The percentage of those finding the arguments neither agreeable nor disagreeable was for (1), ten; for (2), fourteen; for (3), eighteen; for (4), twenty, and for (5), seventeen.

What were the sources of pleasantness? In a few scattered instances they were found in the content of the ideas suggested, as when one observer declared that she found (2) pleasant because it was agreeable to think of virtuous people making profitable use of their time. But the principal sources were (a) thinking the syllogism correct, which was done by ten per cent. of the observers in the case of (4), by two per cent. in the case of (1), and by two per cent. in the case of (3); (b) amusement, which was felt by from one to six per cent. of the observers in the case of every argument, and (c) the enjoyment of tracing and correcting the fallacy, which from two to four per cent. reported with all the arguments. The comparatively large number of persons who thought the fourth syllogism correct may perhaps be accounted for by the unfamiliar character of its subject-matter, which very likely obscured the logical processes involved. No special discussion of these sources of pleasantness seems justified by the data at our command. And if, in general our discussion and analysis of the experiences of our observers appears to be far from thorough, our excuse must lie in the fact that their introspective records were not full enough to warrant us in interpreting the results further. If the observers had been trained in introspection we should have gained much, but we should have also lost something, in that our subjects would have been alike less numerous and less naïve.